A REFLECTION ON THE PROBLEMS OF EVALUATING THE COEXISTENCE BALANCE BETWEEN SHORT AND LONG CHAIN IN THE AGRI-FOOD MARKET: SOME IMPACT INDICATORS

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Abstract

The contribution made by this article is fundamentally to stimulate international debate on a subject that is not discussed sufficiently, or at least not in the terms indicated here, namely not the debate on the short or long chain efficiency and on the relative convenience of each, but the debate on how to establish research to identify what, in different contexts and globally, may be an excellent balance between short and long chain. How they can best divide the market shares up between them, considering the fact that all possible changes to this "balance of coexistence" on a sub-system level of the local market has an effect some distance away on the global system of markets.

This research highlights the complex problems of assessing the optimal coexistence balance (in social wellbeing terms) of long chain and short chain in the food product market on a local and global territorial scale; the evaluation route of a hypothesised procedure to assess this coexistence ratio; the need of constructing suitable food market simulation models designed specifically to identify the above mentioned optimal coexistence balance; the difficulties of constructing these models and the present *state of art* on market simulation models; the analysis of the environmental, economic, and social impacts of short chain versus long chain in there many facets and related indicators and subindicators to evaluate them within simulation models; the interpretative capacity of these tangible and intagible indicators and the various modes (quantitative, proxy, qualitative data) through which they can measure/assess impacts.

Keywords: Food supply; short and long chain; market equilibrium; market system models; impact indicators

Introduction

This study[1] consists of a reflection on the need to analyse the agri-food market mechanisms on a local and global scale in order to make contributions towards identifying the most appropriate level of incidence, in terms of marketing shares, of the short food supply chain[2] in different areas and specific situations and as a whole.

It constitutes an introductory approach to the study of the complex problems of assessing the coexistence ratio of long chain and short chain in the food product market, in order to choosing the socially most convenient balance in the articulation of the possible mixes of these two different commercial outlet methods, (or, for better saying, for the choice of the most efficient equilibrium as mean aimed to the populations's wellbeing).

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[1] This is the continuation of a recent work (Sini, 2014), the results of which, and in particular those of the SWOT analysis, have provided the starting point for the analysis carried out here of the economic, social and environmental impacts of the short chain compared with the long chain on the food market and consequently for the search for the related most suitable impact indicators. This research - taking up some guidelines already given on the same theme (Sini, 2010) - has been pursued in this latter study, in which a methodological route is also hypothesised by which to evaluate the optimum balance (in terms of market shares) of the joint presence of the two chains in different situations. The search for the impact indicators is included in this evaluation procedure, which has, however, been traced out generally and not perfected, and which is in any case proposed to open up the discussion on the problems of evaluating said "balance of coexistence", highlighting the need to develop more in-depth studies in this sense.

[2] Under the scope of the "alternative food network" (AFN), which are alternative circuits to the more widespread conventional circuits, the so-called "short food supply chain"(SFSC) or "short circuit" (farmers'markets, direct farm sales, agritourism, box schemes, pick-your-own, etc.) also commonly referred to as "direct sale" has the characteristic of creating a direct relationship between producers and consumers, individual or associated. It determines precisely a "shortening" of the chain through the elimination or reduction of the number of commercial intermediaries and the journeys travelled by products, for which final distribution takes place in the same area of production. This method of marketing, the advantages of which have been highlighted in literature and by agricultural category organisations on several occasions, constitutes an alternative commercial outlet that contrasts with the so-called "long chain" or with "long circuits" chain, which are more widespread due to the "logistisation and globalisation of commercial flows" (Del Vecchio, 2008).

These circuits are mainly used by oligopolistic businesses of large-scale retail distribution (LRSD) and provision, to a large extent, also the small, nearby stores. It should also be noted that LSRD can also sell local products and reduce the intermediate steps of those obtained from far away, considering that it tends to rationalise the chain, in order to maximise its business efficiency.

"Moreover, what distinguishes the short chain from the long chain is not so much the degree of commercial "disintermediation" in itself ", nor "the reduction of the physical distance between the place of production and that of distribution.....", "as it is the type of more balanced contractual relationship between production, distribution and consumption" (Sini, 2014).

It therefore intends to be a preliminary analysis looking to draw attention to these problems and provide a stimulus for more in-depth research into the matter, which has not currently been sufficiently explored, of optimising this balance, which current market situations lead us to believe will be extremely interesting and well worthy of consideration. It does, however, require greater availability of reliable data to allow for analyses and assessments that are not only qualitative, but also quantitative, within suitable market mechanism simulation models.

This would require the construction of an assortment of alternative models on the various local food markets and on the global food market (with hypotheses of different chain coexistence ratios, different levels of liberalisation and different interactions between the markets) and the identification of suitable quantitative (or quanti-qualitative) indicators to be included in these models for assessing the economic, environmental and social impacts of each of the above different coexistence balances.

Objectives and methods

The general objective of this reflection was to stimulate more in-depth, complex research by which to assess the balance of the coexistence of short and long chain on the agri-food market to be achieved through the construction of models simulating the function mechanisms of the markets system and by means of a process leading to a judgement of a choice of the model able to represent the optimisation of this balance or at least the identification of models representing the most efficient combinations in structuring of a mixture of these two different outlet methods.

The more specific aim of the study was to analyse the strengths and weaknesses of these chains and to offer some contribution to the assessment of their respective efficiency, by means of economic, social and environmental impact indicators. More precisely, the research aimed to investigate the significance of the impacts in there many facets and above all to identify and examine some representative impact indicators of the short chain *versus* the long chain in different contexts, through a critical analysis and gained knowledge of those already available.

The method used studing indicators is simply a context analysis carried out with an in-depth reflection of the empirical evidence and with the support of an extensive bibliography that has enabled an in-depth investigation into the advantages and weaknesses of the short chain in different market situations and contexts on various scales and also to assess the difficulty in measuring each of these and the interpretational efficiency of data, processing and summarised information that can be used to express them and quantify them by means of specific impact indicators.

Regarding the models, it is not used any method studying them, but

proposes a procedure for finding a way to create and evaluate them (and choose) after they are created, advancing ipotheses (to be discussed) for an evaluation process, briefly shown later in a graphic form, which includes the possible use of context analysis, input-output, and multicriteria analyses.

Results and discussion

This reflection on the coexistence balance between long and short chain on the various local agri-food markets and the global agri-food market proposes a hypothesised procedure to evaluate coexistence balance, the path of which is shown graphically in figures 1 to 6 (under paragraph 3.1).

This hypothesised evaluation process should be linked to the discussion (in paragraph 3.2) of the difficulties in its application, with specific reference to the construction of suitable market function simulation models with different levels of incidence of said outlet methods.

Under the scope of the assessment process presented graphically, this work focuses its attention mainly on the impact indicators (to be included with tangible data in the models that are evaluated, to enable the functioning of the latter). A set of these indicators is analysed in depht by a discussion and through a graphic picture (figure 7 to 16) in paragraph 3.3, where some indicators suitable to assessing the economic, social and environmental impacts of the short chain as compared with the long chain, are considered, and the relevant validity discussed.

Hypothesised evaluation route

This paragraph proposes an approach to the evaluation of the optimal degree of diffusion respectively of the short and long chain and, therefore, the optimal balance of their coexistence on the markets. The general lines are constructed of a procedure, which is graphically illustrated, in which there is a hypothesised sequence of analyses, models and individual evaluations within an overall evaluation route.

This procedure is shown in brief in the following figures 1 to 6.

Figure 1: Hypothesis of which procedure to use for evaluating the best level of diffusion of short as against long chain circuits

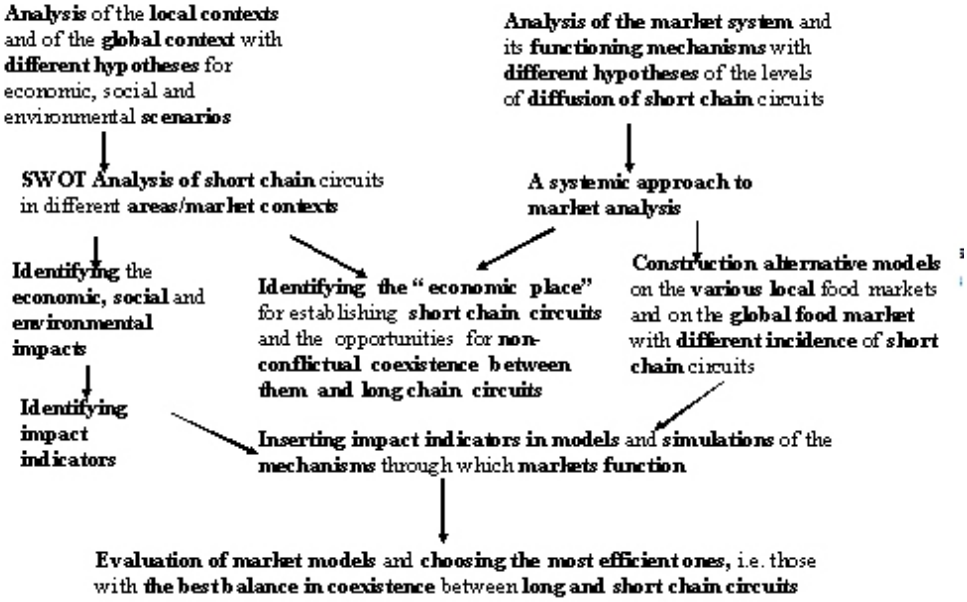

Figure 2: Market Analysis

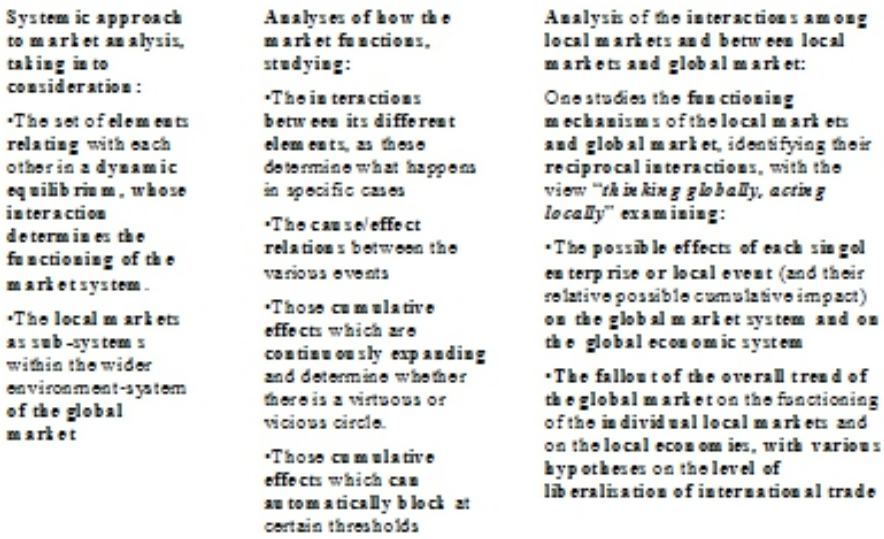

Figure 3: Analysis of the effects of the mechanisms through which the market functions

Analysis of the effects of **each single market action**, identifying the **economic, social and environmental impact of short chain circuits** when **compared to long chain circuits** in the local markets and global market **through evaluation of the various elements in these, including:**

•The **multiplier effects of investments** and **of money** circulation at a **local level** and the **repercussions** on other areas at a **global level**

•The **interactions between local markets**, through the **inter-sectorial effects** on **employment**, **income** and also on the **environment**. This can be done **using regional input-output tables** within **national level**

•The **interactions between global and local markets**, by means of **transnational input-output analysis** (using sectorial interdependences tables obtained from the **WIOD** (World Input Output Data) database.

Figure 4: Construction of models of how the market functions

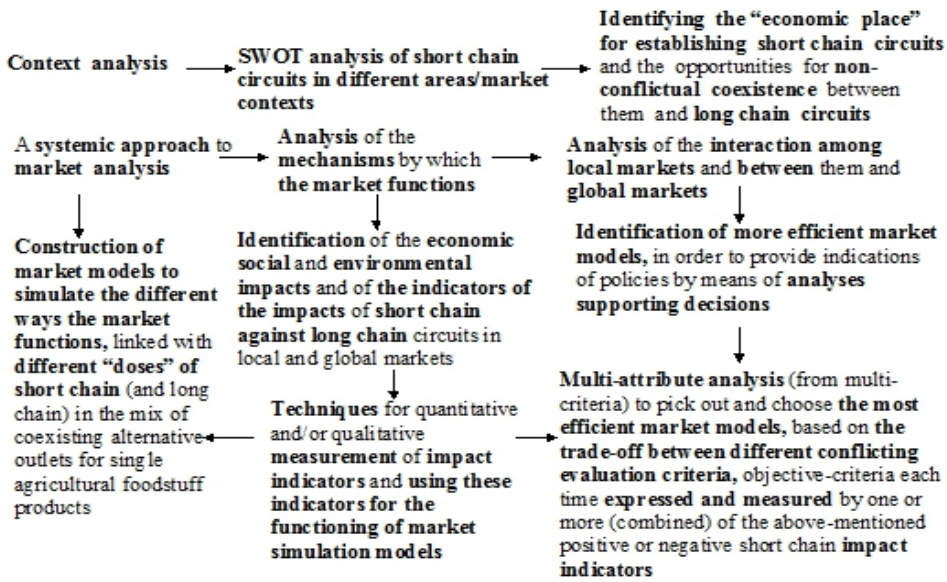

Figure 5: Evaluation of alternative market models

Multi-attribute decision making analysis (from **multicriteria)** for the identification of **more efficient market models**, on the basis of the **trade-off of different conflicting evaluation criteria**, criteria-objective **expressed** each time and **measured** by one or more (in a combination) of the above-mentioned positive or negative **impact indicators** of the short chain.

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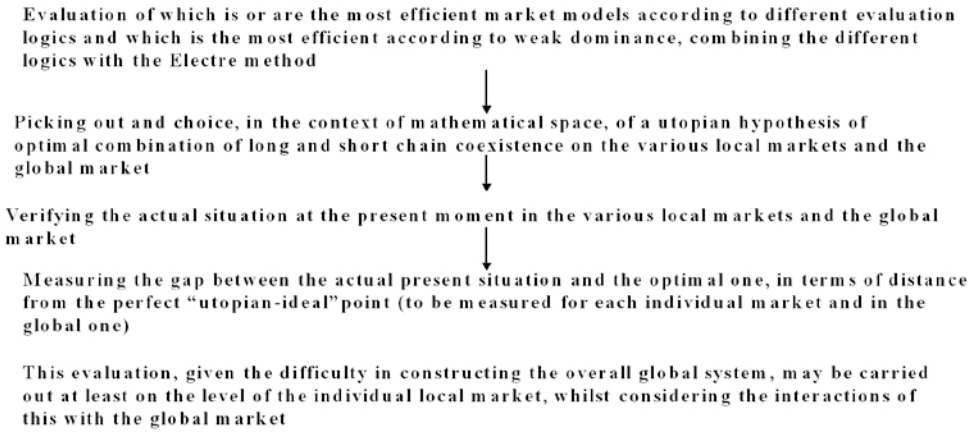
• The **assessment** will depend **on the value of the indicators**, namely the **entity of the** quantitative (cardinal) or qualitative (ordinal) **measure,** with reference to the **unit of measure attributed to them.**

•The **value of the indicators** will **in turn depend** on the **greater or lesser incidence of short chain** in the dosage relating to its coexistence with long chain in different mixes of realistically possible arrangements and combinations of the outlets for the single agricultural foodstuff products on the different markets, but will **also depend on the different weight attributed to the various objective-criteria the indicators express**, with respect to the opinion on their relative importance in different contexts .

•The choice of the **market model to be considered the best**, of the variety of efficient ones, **will each time ensue** from a **different hierarchy obtained from the different multi-attribute analyses adopted, which can use qualitative or quantitative type data.** With regards to the **qualitative type analysis** (analytic hierarchic process, regime analysis)**,** the result will vary depending on **the weights assigned to the different objectives.** With regards to **quantitative or quanti-qualitative analyses (**weighted sum, max-min analysis, weighted or non-weighted, concordance or discordance analysis, weak dominance using the Electre method (Roy, 1991), the result will vary **according to the different order logics** (Colorni, Laniado, 1991) **chosen for use** (e.g. satisfaction of the choice of a certain combination of chains or regret for having abandoned other combinations; optimisation of the market performance considered as a whole, considering all positive and negative impacts; or minimisation of the risk of negative environmental and/or social and/or economic impact), to **adapt the judgement** to the **objectives** considered as a **priority to pursue, depending on the circumstances and the assessment context**. Therefore, the **simultaneous use** of several methods coinciding with **different logics** or which refer to a combination of them (electre method) will allow for a **more complete vision in support of the judgement of choice**.

Figure 6: Evaluation of the distance from the optimal "utopian-ideal" point



The evaluation procedure proposed needs information and statistical data from which synthesis indicators may ensue to be included in market simulation models, models suitable to the specific type of evaluation considered. In addition to the work of collecting already existing and

available data, recording missing or incomplete data and singling out synthetic indicators able to represent them globally, there is therefore the problem of finding such models in the literature, or constructing them *ex novo.*

The need and the difficulties of constructing suitable food market simulation models

For the last few years (Sini, 2010), the deficiency in literature has been noted of suitable market simulation models, designed specifically to identify, in terms of marketing shares that can conveniently compete on each of these, the optimal coexistence ratio of long and short chain on a local and global level.

This is a deficiency that continues to be noted, despite some interesting attempts to bridge it having been made in the meantime on a local level (Cicatiello, 2012; Ruta, 2012).

Once again in this work, the need is therefore highlighted, and at the same time the difficulty considered, to construct complex models for the simulation of alternative agricultural food market functioning scenarios, with different degrees of diffusion of the long and short chains. We discuss about models which simultaneously have to consider the impacts on a different scale of the different degree of diffusion of these two alternative outlet methods and the respective dosages under the scope of possible mixes in the range of combinations on the markets, and feedback on the global market of the effects obtained on a local scale and vice versa.

In assessing short and long chain coexistence, in terms of market shares due to each, we must also assess the trade- off between a greater or lesser degree of market liberalisation[3] underlying this, considering that the short chain, in many cases, superimposes neoprotectionism phenomena, both in developed[4] and developing countries[5], with the respective effects in terms

[3] Which, in turn, requires complex assessments ridden with problems (De Benedictis, De Filippis, Salvatici, 1991), involving aspects of the positive and normative economics

[4] Consider the '*localvore*' movement or the successful slogan '*buy fresh, buy local*' linked to an ideology concerning environmental, health and/or support aspects to local development, which leads to the exclusion of imported products from consumption. This ideology, if exacerbated, can reverberate at a distance, severely damaging the developing countries that export certain agricultural food products, for which export trade the survival of entire rural populations there, depends precisely on the income from this (Muller, 2007).

[5] Where the short chain can, in certain situations, constitute a useful tool to a partial "release" (Amin, 1990) of the poorer economies from relations and international trade based on asymmetrical contractual strength that results in exploitation. Considerations of this type are however now considered valid, even without referring to strategies connected with the now past theory of "dependentists" and, as a general rule, even without derecognising the advantages connected with free trade. Moreover, cases of the contingency of exports (e.g.

of global balance. This requires alternatively devised models simulating the functioning of the foodstuffs market and international trade of agricultural products to be singled out and adopted, either with the hypothesis of complete liberalisation and delocalisation of production of the foodstuffs marketed, or with the hypothesis of a minimum of protectionism and greater presence of local commercial circuits of the domestic product.

These need opens up a vast field of research that must start from the choice of more general international trade and regional development models[6], within which specific food market models can be constructed, focussing on the issues at hand[7].

On this regard, despite considering the general validity of orthodox theory-based regional growth and international trade models (compared cost consideration in the classic Ricardian model and derivations thereof), we have noted greater adherence to the current reality of heterodox models considering circular causation phenomena (Myrdall,1957) and agglomeration[8] (Krugman, 1991), with cumulative effects tending to increase unbalanced situations, rather than a return to a Walrassian type equilibrium. The interpretative capacity of the latter models in fact appears greater, particularly with reference to trade between countries or territories with different development situations, in a world market characterized by imperfect competition and increasing returns (typical of increasingly larger, oligopolistic businesses of LRSD), mobility of production factors and freedom in business localisation strategies, as well as an increase in the trade of certain goods that, on the foodstuffs market too, tend to be identified as "positional" (Romano, 2007; Yotopoulos, 2007). In the assessment, therefore, of the respective degree of short and long chain expansion under various hypotheses of balance in coexistence between chains and of market functioning modalities, cumulative effects must be considered. Over time

rice) have been seen in fairly recent years (2008 in particular) in developing countries only in situations where there is a deficiency of product and emergency, in order to prioritize internal provisions, with no explicit connection to dependentist economic-ideological reasons.

[6] By choosing between the different types of codified models available for both nationall and international trade (models that can be grouped under the scope of partial balance models or general balance models, monosector –multicountry or multisector – monocountry or multisector – multicountry, with different variants and different hypotheses of elasticity of supply and demand, crossover effects between sectors, etc.) and for regional development (seen under various hypotheses differing in terms of economic balance/imbalance).

[7] It is a question of articulating, within the stated general models, specific models able to represent the elements brought out of the different agricultural-food market function mechanisms that we wish to assess, with the relevant spin-off on both a local and global scale. Clearly, also the effects on different scale will require the use of differentiated models.

[8] We refer to the formation of 'centres' and 'peripherals', namely the formation of strong regions (and peripheral areas) and districts (many different specialised clusters).

these can generate vicious cycles, but also virtuous ones, in centre-periphery relations involving various local territories, with specific reference to the development of rural or agricultural foodstuff districts, where it was possible to ascertain the existence of non antagonistic relations between the two chains (Castellani, 2007; Sini, 2009).

From what has been said, it is clear that in order to represent the complexity of a macro-system relating to the global market and the reciprocal inter-relations between individual local markets and individual local markets with the global market, in order to evaluate the various alternative market situations, it is not the individual models to be compared that need to be configured, but rather different *systems of models*. We use the term "system of models" to means a "coordinated set of models" essentially consisting of a "central model" and a series of "peripheral models" that, from a certain point of view, can be considered as expressive of given "sub-systems" of the "general system" of variables involving a planning and evaluation process (Archibugi, 1993). This system should have "the capacity to overcome the dichotomy …between holistic models and partially-operative models and achieve the sought-after "connection" between them" (Ibidem), without obliging us to evaluate trade-offs and choose one type or the other. This should, therefore, benefit from the specific efficiency both of the global models and partial-operative models, at the same time avoiding the particular aspects of inefficiency of each of these[9].

The difficulties that the construction of these individual models and systems of models entail, depend:

- on the objective complexity of the representation of a macro-system relating to the global market that includes all subsystems of the local markets and reciprocal interactions;
- on the capacity to evaluate and measure the cumulative positive or negative effects that can be generated by each movement in the individual markets;
- and on the operative limitations lying in the absolute lack of data, or in any case of homogenous, comparable data, on a local level, both in developed countries (where there is a lack of important data on a sub-regional level, such as, for example, the matrices for input output analyses

[9]The partial models – now for years extensively widespread and used in operational research processes to represent individual aspects of the reality (mathematical type models: econometric, sociometric, etc.) – enable us to "have variables directly connected with the problems to be dealt with", but suffer the "little knowledge and control of inter-dependencies with the context". Whilst, vice versa, aggregated, global ones allow us to grasp "all relevant inter-dependencies" and "maintain a holistic vision of the social and economic system", but have "the defect of superficiality" and "poor representativeness of the effective reality" caused by "an excess of statistical aggregation" (Archibugi, 1993).

available at national and regional level only), and, above all, in developing countries and, consequently, on a global scale. It should, however, be remembered that despite this, in recent years databases have been developed and made available for the construction of transnational input output tables: WIOD (World Input Output Data)[10], that enable certain analyses to be carried out on a global level (Timmer, 2012; 2015; Stehrer et.al., 2014).

Amidst these difficulties, we must set objectives that can currently be achieved, such as analysing the individual local markets, above all on a regional level, where input-output models can be used for the economic repercussions (of each individual market movement) and also for the environmental repercussions within the region and between regions of a single country. Market models could also be constructed on a regional or sub-regional level for rural areas for which data already collected can be had, or for which data can be collected, each time estimating the possible interactions with the other individual local markets in the global market. It is considered that an attempt could be made to carry out analyses on a global level with reference to the individual product, whilst on a regional level, the effects could be studied of local marketing circuits, also for aggregates of agricultural food products.

In studies carried out thus far on the short chain, interesting individual models have been constructed with reference to the local-regional scale, or at most the national scale: for example, in the studies (Boyde, 2001; Meter and Rosales, 2001; Swenson, 2006, 2008, 2009, 2010; Sontang, 2008; Hughes et al., 2008; Henneberry et al., 2009) on the effects of the short chain on the multiplier of the investments or on the increased employment connected with the local food sale circuits, which generally use input-output models and refer to the "leaky bucket" metaphor (see paragraph 3.3.2); in the studies in which the behaviour of the short chain is examined as an instrument for rural development (like that of Renting et al., 2003, where empirical data is used to examine the impact of the short chain on rural development in seven European Union Member States); in the studies in which research and evaluation covers the economic, social and environmental impact of the short chain in a given context (Cicatiello, 2012, in the area of Viterbo; Ruta, 2012, in the area of Siena).

These models specified above refer, however, to scopes that in all these studies have always been considered as *closed systems*: there are no references, in fact, on the possible repercussions on a global scale of the impacts highlighted by the indicators used.

[10] World Imput-Output Database covers 40 countries (27 EU countries and 13 other major countries in the world for the period from 1995 to 2011) and includes a model for the rest of the world.

Other studies with global type models on the marketing of food do not refer to the short chain: they regard, for example, the analysis of individual effects of food marketing (for example on employment) with reference, however, to the action of the large commercial chains (I.L.O., 2007), yet others regard the trends of the international market or these trends in relation to those of agricultural production and the demographic increase with related consumption of resources (water in particular) and impact on the environment. Of the latter, in which an attempt could also be made to include a reference to the market share of the short chain, juxtaposed with the long chain, the IMPACT (International Model for Policy Analysis of Agricultural Commodities and Trade) model (Rosegrant et al., 1995, 2001, 2012) of IFPRI (International Food Policy Research Institute)[11] and the MIRAGE (Modeling International Relationships in Applied General Equilibrium) model (Decreux Y., Valin H., 2007), of CEPII (Centre d'Etudes et d'Informations Prospettive Internationales)[12], are particularly important. These are in any case models that in turn are thus far found to be isolated "closed" systems to a local-global vision, insofar as they have no direct,

[11] Partial balance model, designed from the early 1990s to examine future alternatives for the provisioning of world food, demand, trade, prices and food safety, the first results of which (Rosegrant et al. 1995) and more complete results (Rosegrant et al. 2001; 2012) provide forecasts through to 2020. IMPACT has been used for a great many research projects proven by publications and reports for IFPRI (among which, Rosegrant et al., 2013) and for international organisations such as the World Bank, the Asian Development Bank, the FAO and national governments.
The model includes analyses of the 44 main raw and agricultural materials produced worldwide with reference to 115 countries. Within each geopolitical macro-region supply, demand, and prices for agricultural commodities are determined. All regions are linked through trade. The forecasts therefore refer both to a global world level and the level of the individual country.

[12] This is a multi-country, multi-sector general equilibrium dynamic model, initially designed by CEPII as from 2001 and shared first and foremost by the IFPRI, which is one of the main developers and users of the model, and by various other international institutions - like the European Commission DG Trade and the DG Enterprise, the INRA (Institut national de la recherche agronomique) for France, the Economic Commission of the United Nations for Africa, and the World Trade Organisation - which are part of a Consortium instituted in 2007, aimed at activating technical discussions on the model and extending its dissemination (MIRAGE Wiki, 2011). This model uses the GTAP7 as a database (which can include 113 macro-regions of the world and up to 57 economic sectors) and the MacMap- of the SA6 (which enables it to have a high level of detail higlighting the protection's effects). MIRAGE, which has a high degree of flexibility (it can be used in various different hypotheses: static or dynamic approach, perfect or imperfect competition, etc.) has been developed mainly to study the scenario of international commercial agreements, has indicators that enable it to evaluate the impacts of any changes in commercial policy and has been very much used to evaluate bilateral and multilateral agreements.

specific connections with the individual micro-realities of limited local scopes.

In any case, neither on a local level, nor - above all - on a global system level of the markets, do we find in literature studies on the research for the most suitable dosages aimed at obtaining the optimal balance between short chain and long chain, even if on a local level, comparisons have been drawn (Cicatiello, Pancino, Franco, 2012; Cicatiello, 2012; Ruta, 2012) between the individual performance of different types of chains and (in the above mentioned works pursued by Cicatiello et al. and by Cicatiello) on the performance of some different combinations of individual chains[13]. In all the studies mentioned (both by Cicatiello and Ruta), suitable indicators were used that were appropriately weighted, within qualitative or quanti-qualitative[14] and hierarchical multi-criteria analyses, like the Analytic Hierarchy Process (Saaty, 1990). These comparisons of chains are very interesting as they can constitute (particularly those carried out by Cicatiello, which attempt an approach to the evaluation of combinations of chains) the first step in leading, at least on a local scale, to the subsequent identification of excellent dosages between the two types of long and short chain, each expressed by different sales channels.

The problem to be solved consists of identifying the optimum dosage of short and long chain in the global macrosystem of the markets, as resulting from the optimum dosage of the two types of chain in each of the many individual local microsystems. Within these (for the latter), consideration must be had of the trade-off between policies aimed at achieving well-being on a local level (which presupposes both economic and social and environmental sustainability of the commercial activities) and responsibilities in local choices on the situation created on a global level in relation to the well-being of other populations too, in other micro-regions. For this, any local evaluation must be pursued also considering the fact that if production grows in an area for export, in another area the absorption of imported products must grow, as well as if production for local consumption grows in an importing country, must grow total domestic consumption, or the import must decrease. Therefore, in the "coeteris paribus" hypothesis (which presupposes the absence of variations of other variables not included

[13] In the study of Ruta the impacts of market channels via short chain and via large-scale retail distribution have been compared in a simple way. In the studies of Cicatiello the impacts of various combinations of different levels of incidence on the market of the farmer market sales channel have been compared (with reference to only environmental indicators in the first work mentioned, and also to economic and social indicators in the latter), under the scope of the short chain, juxtaposed with different levels of incidence of the large-scale retail distribution and retail channels within the long chain.

[14] With indicators in each case expressed by numbers of ordinal significance.

in those depending on the above-mentioned local choices, including consumption among the independent variables) if within an area, the portion of consumption of local food products grows, without growth of total internal consumption, the portion of food products to be imported decreases automatically. (This can create a movement of income to the detriment of the areas exporting).

Everything must be represented by an appropriate *system of models*. The construction of a *system of models* of local and global markets must overcome a great many difficulties connected with the transpositions of scale and micro-macro connections, which present conceptual questions and evaluation problems that are not easy to solve[15].

We must, therefore, avoid falling into the "local trap" (Born, Purcell, 2006[16]) or, more generally, the "scale trap", which tends to overestimate (but may in some cases also underestimate) the efficiency of the short chain, considering local circuits as more advantageous or, alternatively, the efficiency of the long circuits, considering the latter to be more advantageous, as though the local or global marketing scale should constitute an objective to be achieved and not a tool - in itself neutral - by which to obtain the well-being of the population in various contexts. It is the well-being of the populations, simultaneously on a local and global level, the end to be maximised, whilst the optimisation of the coexistence equilibrium between the two chains is the strategy, the means we can use to achieve it. In themselves, the local circuits or the long circuits on the global market, are neither good nor bad, we cannot express an opinion of merits in their regard, also because they are alternatively more efficient, in terms of pursuing well-being, when they find their specific "economic place", each in different situations of market equilibrium or different territorial scopes (differentiated in terms of productive structure, consumption and/or scale[17]) and can also advantageously (with regards to the impact on well-being) coexist (Sini, 2014).

[15] As concerns these problems, see, for example KnicKel and Renting (2000), who deal with the complex nature of micro-macro relations, with reference, however, to the evaluation of other aspects of the agricultural economy, such as the connections between the multifunctional nature of the farms and rural development.

[16] These authors highlight how this trap can ensue when due account is not taken of the traditional methodological question of planning, linked to the clear distinction and connection between means and ends.

[17] It is clear that, as a general rule, the short chain is a more useful means for pursuing well-being on a local territorial scale, insofar as it avoids resources leaving an individual given area (where, perhaps, favourable conditions can be found to be realised), increasing within the monetary circulation; whilst on a more extensive territorial scale (which considers the multiple situations of various countries, with different commercial needs), can be less efficient.

Some impact indicators that could be used in simulation models[18]

Once the models reproducing the function mechanisms of the market on a local and global scale have been built, in order to use them we need concrete data and specific indicators highlighting the impacts of different alternative function modes. We refer to the assessment of the function methods deriving from the alternative combination of different 'doses' of the short and long chain, aimed at choosing that which is socially most convenient.

The following is a discussion on the representativeness and difficulty of calculating some impact indicators that could be used within models simulating the different coexistence situations of the short and the long chain, aimed at discovering the best possible balance between them in different contexts.

As such, a set of indicators of the short chain juxtaposed to the long chain, suitable to assessing the social and economic, as well as environmental impacts[19], is considered.

Before discussing the interpretative capacity of these indicators, the positive and negative impacts of the short chain in markets are analysed thoroughly, and the possible ways by which they can be measured. Sometimes, some positive impacts for the short chain are expressed and evaluated by certain indicators as the consistency of negative impacts avoided (impacts that would have been had with the long chain) and, vice

[18] The content of paragraph 3.3 of this article partly takes up again some of the concepts already expressed in a previous paper I wrote in 2010 for the 116th EAAE Seminar "*Spatial Dynamics in Agri-food Systems: Implications for Sustainability and Consumer Welfare"*. Nevertheless, the overall content of this paragraph has been developed much further, both in the new written parts, which enlarge on the concepts, introducing others, and in the new creation of various explanatory graphs, compared with what was written in the previous work. Only the written part of sub-paragraph 3.3.1 almost completely repeats what was said in the 2010 paper, but this is a necessary, essential introduction to the new graphs, which for the sake of brevity was not expanded.

[19] According to the well established approach "Triple Bottom Line" (TBL). The conceptual evolution of this approach, started from the initial idea of TBL, originated at the World Summit on Sustainable Development in Rio de Janeiro in 1992, where the first definition of the concept of sustainable development was given (WCED, 1987), in relation to the three aspects of economic efficiency, environmental sustainability and social equity (inter and intra-generational), performing the division into three pillars echoed by Agenda 21. Cicatiello (2012) showed that the approach to the sustainability of a system based on the three above-mentioned areas was later improved and discussed (Goodland,1995), until it was defined and named TBL (Elkington, J., 1998), and finally included in the Report of World Summit on Sustainable Development in Johannesburg (UN, 2002, art.5), becoming increasingly used.

versa, some negative impacts are evaluated in terms of the absence of positive impacts that could otherwise be achieved (with the long chain).

For the impact analysis an approach was taken to the problem that did not refer to the agricultural food sector but rather to the territorial system, or, better still, to the individual local territorial systems. This is a privileged viewpoint from many authors (Sevilla Guzman and Woodgate 1999; Goodman, 2003; Brunori, 2007) in the analysis of the local food chains, also with reference to product quality. In actual fact, this approach (which positions the local system at the heart of the analysis in matters of the agricultural food sector) better highlights, in a system logic, the interwoven, partly overlaid effects on environmental, social and economic sustainability, caused by the marketing via the short chain (Cicatiello, Franco, 2010).

It must, however, be specified that in this study, the scope of the individual local system is not placed as a single centre of the agricultural food market analysis. Rather, although valuing what occurs within the local systems, the interactions between these on a global market level and the issues related to such interactions are highlighted, considering - in terms of "think globally, act locally"[20]- that the fallout of local action can happen even a long distance away.

The indicators proposed and the related calculation methods therefore partly concern a local territorial scale and partly a global territorial scale.

In this regard, despite having ordered the set of these general indicators and more analytical sub-indicators[21] in logical-conceptual terms in relation to the type of impact, as already proposed in a previous approach to the problem (Sini, 2010), here has been no systematic hierarchy created, nor any complete explanation and simplification of the complex calculation methods for all individual indicators (in particular the intangible ones), as in other works (e.g. Marino, Cicatiello, 2012[22]; Cicatiello, Pancino, Franco, 2012 and Cicatiello, 2012[23]). In these latter the scope of investigation (national and local) is more circumscribed and specifically defined and the

[20] Slogan (designed by the microbiologist, philosopher and environmentalist Renè Dobous in 1978), extensively used by various authors in different contexts, including the economic one, by businesses and marketing, overlaying in these latter contexts with the term "glocalisation" (created in Japan in the 1980s), which is more commonly-used by sociologists and economists.

[21] The second are those that can be concretely quantified or in any case are somehow able to be evaluated, even when they are intangible impacts. The analysis of the impacts in fact pushes through to reaching indicators that are able not only to express them but also be be able to "measure" and evaluate them.

[22] Where above all a theoretical work is faced, of creating a hierarchy and some indication is also given to an at least qualitative type evaluation approach of the impacts on the territory, with reference to a national level.

[23] In these latter, quantitative evaluations are also performed on a local level.

degree of investigation is higher[24]. In any case, the set of indicators proposed here cannot even be compared with that of the works mentioned above, due to various reasons[25].

Measurement of environmental impact

The positive impact of the "farmers' markets" and, more generally, of the sales methods with short circuits, is almost always mainly considered from an environmental viewpoint, and less frequently with regards the social and economic aspect. More specifically, in a certain sense, and at least in relative terms, its environmental worth is overestimated, and its social and economic aspect underestimated when not linked to the environmental worth (Sini, 2010).

The public, and not only researchers, are now aware of the widely-covered issue of food miles[26], or rather the mileage covered by food products on long journeys in the global market through the long chain and the opportunity of a zero kilometre food distribution aimed at reducing not so much the economic cost of transport as, above all, reducing pollution by CO2.

Far less known, instead, is the debate raised by a scientific thread that has a critical attitude with regards the assessment of the environmental cost that exhausts in considering the advantages of zero kilometre supplies. In actual fact, what must be considered in assessing sustainability is not only the environmental cost of transport, but also the different food production systems and a "scale ecology" (Schlich, Fleissner, 2005), which also considers energy saving linked to the size of the agricultural and

[24] Which has led, after an analysis of literature on the matter, to the choice of certain sub-indicators and synthesis indicators suitable to the context examined. More specifically, in the works of Cicatiello, Pancino, Franco (2012) and Cicatiello (2012), where (after directly recording the nececessary data) the calculation is also made concrete of these indicators in a specific case study, the indicators chosen as representative of the impacts are calculated with reference to a single product and a precise local territorial scale (the apple market in the province of Viterbo) and the specific effects of the farmers' market channel and the large-scale retail distribution and retail channels, comparing the results of a different mixture of different degrees of incidence on the market of each of the three channels.

[25] Insofar as it represents different aspects and manners of both economic and social and environmental impact, of a more general nature and in any case, otherwise emphasised; it is moreover differently structured in its articulation.

[26] Started in the early 1990s and then more widely covered in later years. The phrase 'food miles' was first coined by British academic Professor Tim Lang in the mid-1990s (Paxton, 1994). With regards the disclosure, simply consider the frequently-cited paradoxical case (highlighted by Wuppertal Institute researchers) of the total length of the various journeys linked to the sale of strawberry yogurt in Germany, due to the various movements of the raw materials, pots and caps, produced in different areas, through to assembly and final packaging for selling in Stuttgart's market and other areas.

transformation businesses, allowing for an overall consideration of all environmental compared costs of obtained individual farm products in different parts of the world. These environmental costs can be different, with reference to both the natural climatic specifics and to business organisation and dimension[27]. Another consideration worthy of note is that, where production and transport methods are equal, the environmental costs of production of food naturally vary according to product type, hence the same consumer food choices[28] significantly affect this (Weber, Matthews, 2008). It is therefore important to consider what food is chosen and not only where it comes from.

Finally, even if it is *more frequent* for a food produced locally (particularly if a seasonal product not obtained by forced greenhouse use) to create less energy consumption than imported items, the hypothesis that local food *always* requires less total energy than an imported one is false. Furthermore, several studies[29] in U.S.A. and in the U.K. show that around 80% of emissions linked to food products are generate prior to their leaving the farms.

[27] In actual fact, an inverse link has been found between the dimensions of the company and energy saving (Schich, Fleissner, 2005): small companies are less efficient in energy terms, and this is reflected on the end product. Various studies have been carried out on these matters. For example, it has been found (Schich, Fleissner, 2005) that it takes less energy to produce lamb in a large New Zealand farm and ship it to Hamburg, than to produce it in a small farm in Germany. In addition to the business size, the climate is also relevant, determining different energy costs in the countries. In fact, in Germany the sheep have to be kept inside and fed with fodder for the harsher climate for at least five months, whilst in New Zealand this is unnecessary. As regards the climate factor, another study (Muuru, J., 2009) shows that green beans air couriered from Kenya to England have a lesser environmental impact than those produced in England. Similar aspects are noted in a report on others researchs (Wangler, 2006). It should be said that some of the results of these studies have also been distributed by the press and this suggests a progressive informing of the general public: see an article from the New York Times (McWilliams, 2007), which gives the example of the NZ lamb's meat and an article in The Observer (McKie, 2008) reporting on the green beans imported from Kenya, declaring how "The myth of food miles hurts the planet".

[28] For example, the production of zootechnical products requires greater energy expense with respect to that of cereals or other plant products. Hence the choice of a vegetarian diet in itself determines energy savings.

[29] These are last decade'studies that consider all impacts linked to food produce, not only therefore to their transport through to commercial distribution, but the entire cycle of production, transformation, storage, transport, through to consumption, also considering that the various stages of the products life cycle have different importance for different food groups. (See, for example, the final report Defra (2008) on "Comparative Life Cycle Assessment of Food Commodities Procured for UK Consumption through a Diversity of Supply Chains"; Weber, Matthews' article (2008); Wangler's report (2006); some of the researchs published by the Leopold Center for Sustainable Agriculture links, et al.).

As such, a great deal of criteria can be proposed to assess the environmental impact of the long and short chain with reference to the entire food production and sale cycle[30], and only one of these can be expressed as an advantage of the pollution damage avoided and energy savings made by reducing transport (DEFRA, 2005; MacGregor, Vorley 2006). Furthermore, this criterion may also be somewhat limiting, assessing using merely the distance in terms of miles travelled by food products from the field to the sales outlet (Defra, 2005). In actual fact, we must also consider the means (e.g. by air, sea, land on wheel or rail) and transport efficiency (linked to vehicle dimension and load coefficients[31]), as well as the journeys made by consumers themselves. As such, in some cases, and particularly if we consider consumer travel, the logistical organisation of Large Scale Retail Distribution (LSRD), even if with long circuits, may actually be more efficient in terms of energy consumptions than the short chain[32] (Saunders, C. and P. Hayes, 2007).

However, on this we can object that, in assessing consumer travel, we must also consider, in the case of buying direct from a farm for example, the recreational aspect linked to the discovery of food and wine tourist run (the wine ways, the oil routes, etc.). Both when dealing with the travel of tourists from afar, looking to explore a territory in full (including typical food produce) and with close-by trips made by consumers moving locally from town to the countryside, the journey serves a dual purpose: that of satisfying a cultural and tourism demand as well as the closely-linked but perhaps secondary need for food. It therefore becomes difficult to isolate and assess

[30] The complete calculation, 'from the garden fork to the table fork' is often very complicated, as it is a question of estimating very different production methods, calculating energy costs ad pollution for ploughing, sowing, harvesting, the quantity and type of pesticides used, transport, storage and so on (Bressanini, 2008).

[31] High load coefficients typical of heavy goods vehicles (HGVs) used on long journeys actual reduce impact per tonne of food. The environmental impact due to the distance travelled may, therefore, be offset by the vehicle dimensions and transport efficiency. A correct assessment of impacts must therefore take a more thorough look at this type of study too (DEFRA, 2005).

[32] An indicator based only on space travelled cannot be a reliable indicator of total environmental impact, for many reasons. One of the difficulties lies in the fact that around half the mileage covered, 48%, is travelled by the consumer/buyer. In these terms, it is ecologically preferable to purchase products in a centralised supermarket than travel to different smaller shops. Furthermore, large scale retail distribution transports goods more efficiently, using just a few HGVs in lieu of a higher number of less efficient vehicles used by a non-centralised distribution system (DEFRA, 2005).

As concerns the impact of buyer travel, a study (Saunders and Hayes, 2007) calculated that if a consumer should travel 10 km by car to buy just 1 kg vegetables, perhaps from the local farm, he generates more CO2 than if the vegetables were to come from Kenya.

the environmental cost of the journey exclusively with reference to food purchase.

In short, a set of key indicators that can be used, each of which in turn involves the calculation of a series of underlying indicators and assessments, as can be seen from more in-depth studies on the matter (DEFRA, 2005), is given graphically. The following figure 7 to 9 provide a summary picture of the environmental impact indicators examined and their measurement mode.

Figure 7: Certain indicators of the positive and negative environmental impact of short chain circuits

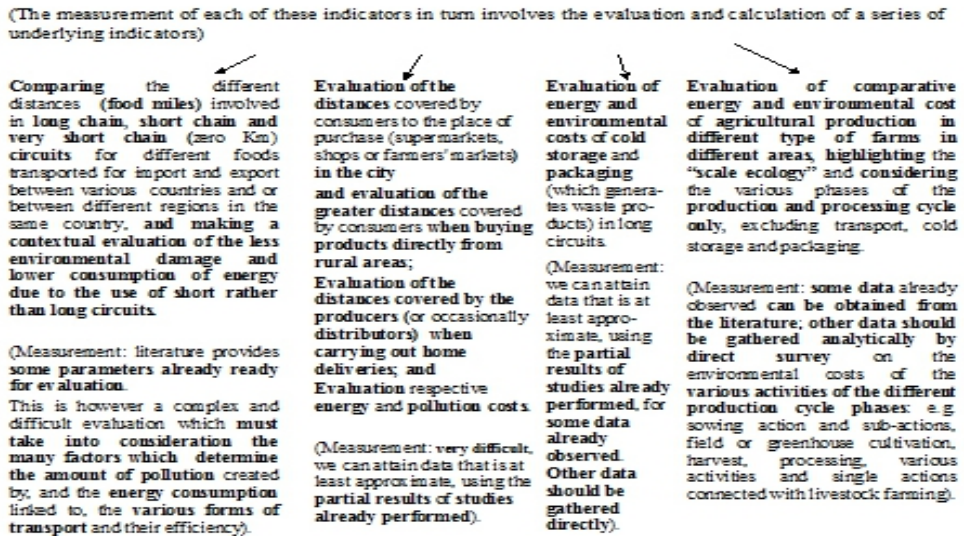


Figure 8: Synthetic global indicator of (positive-negative) environmental impact of the short chain

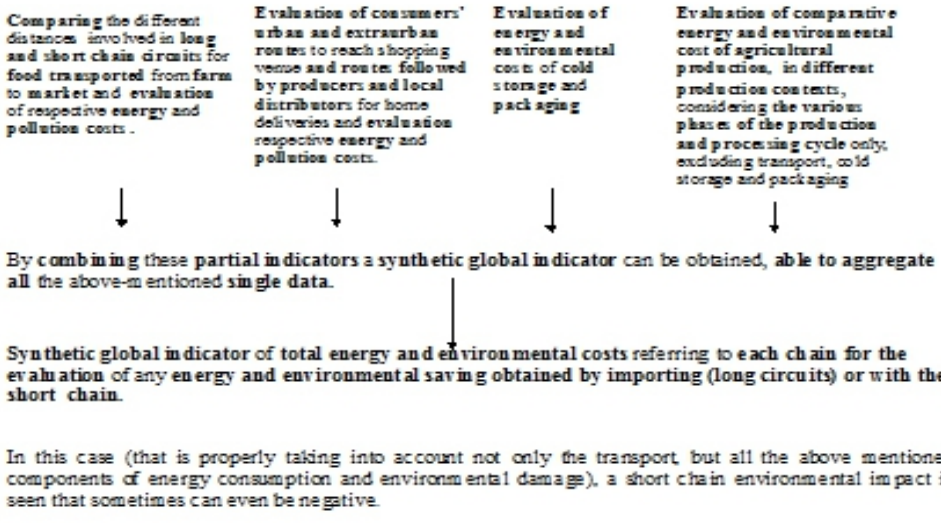
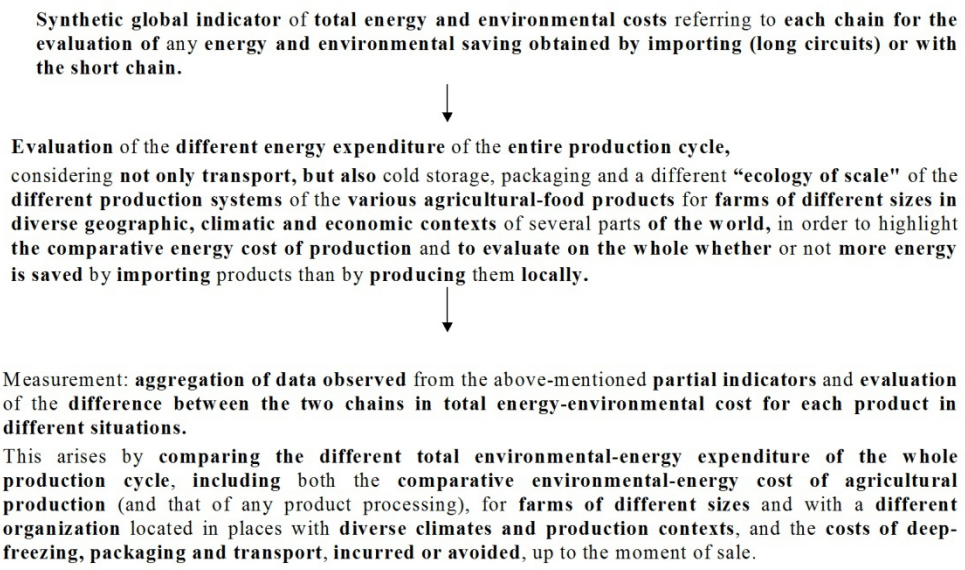


Figure 9: Synthetic global indicator of (positive-negative) environmental impact of the short chain



Measurement of economic impact

As mentioned above, there is much talk of environmental costs linked to long circuits, and less of the social and economic costs linked to the oligopolistic aspects, and, above all oligopsonistic aspects of LSRD, which grow prospectively parallel to the progressive concentration of companies in a situation of growing returns. More specifically, oligopolistic market power could – though this is debatable, as will be explained below – reduce consumer surplus (reduction higlighted by the breadth that the Harberger triangle (1954) can take on, representing the loss of economic efficiency[33]), while oligopsonistic power undoubtedly damages farmers (Sini, 2014). With regard to the problem of negative spin-off of LSRD power on producer wellbeing, it has been shown (Alston, Sexton, and Zhang's,1997[34]; Zhang

[33] Caused by monopolistic power (Harberger,1954), or even, in this case, by oligopolistic power, in terms of net loss of a share of consumer surplus, realisable and entirely usable by the consumer in conditions of perfect competition, which, in non-competitive market structures, cannot be used by consumers and is only partly reabsorbed by the profits that can be used by businesses with market power, and is therefore partly lost. The breadth of this triangle increases for market structures that are increasingly distant from conditions of perfect competition, until reaching a stage where it covers 25% of the total surplus generally realised in a market with perfect competition (Sexton, 2009).

[34] With specific regard to the effects on the distribution of the benefits of agricultural scientific research to businesses.

and Sexton, 2002[35]; Sexton et al, 2007[36]; Saitone, Sexton and Sexton S.E., 2008[37]) that this distorts farmers' production decisions and discourages there investments. Marketing companies can capture large slices of the benefits from policies focused on farmers (Sexton, 2009). This can have important spin-offs on the correct evaluation of the result both of measures in favour of farmers in projects implementing the said policies (Russo, 2008) in developed countries, and of policies for liberalising international trade too (Sexton et al., 2007), under the scope of strategies aimed at encouraging farming in developing countries.

These costs (in terms of lost benefits) can to a certain extent controlled and offset by the presence of alternative sales methods that return value to producers and production territories. We refer to the effects generated by local commercial circuits. The latter have a positive effect, increasing the circulation of money in the area where they occur (Hilchey *et al*., 1995; Bullock, 2000; Ilbery and Maye, 2005), avoiding the leak on the outside of the produced money income[38]. The importance of this is well seen in the metaphor of the "leaky bucket"[39], used by various authors and organisations and, in particular, the NEF (New Economics Foundation). This increased money circulation within a local economy becomes important as, in turn, it can increase investments, employment and income for the local economy.

On the other hand, we must also consider that the promotion of local production-consumption circuits, although able to start of employment and

[35] With specific reference to product promotion investments.

[36] With specific reference to the effects on the benefits of commercial liberalisation.

[37] With specific reference to the effects on the distribution of the benefits of public grants (in the specific case, grants distributed in the USA to cereal crops for the production of ethanol). The assessment model, previously only competitive type, is extended in a framework that considers the market power both up and downstream of farms.

[38] According to Hilchey the development of the local market is able to reduce the release of the money from the local system due to the purchase of goods produced elsewhere and then to strengthen the autonomy of the local system.
Ilbery and Maye supported this assumption by connecting it with the local multiplier effect, highlighted by Bullock, which will be discussed below.

[39] The local economy is imagined as a bucket containing water (i.e. income). If someone spends money on local food products, the money spent remains in the bucket. But when consumers and businesses pay for products or services (both consumer and investment goods) purchased outside the area, the money spent leaks out of the bucket as if there were a hole in it, and leaves the community. "Local economic studies show that many U.S. regions lose hundreds of millions of dollars each year because they import food from far away, or because farmers spend more money raising food commodities than they get back from the marketplace" (Meter, 2008).
By plugging the cracks in the bucket, money can be retained in local communities, strengthening local economies.

income growth processes in the area where it is introduced, it does pose the problem of the choice of increasing farming income in different regions. It is not, in fact, a given that such circuits create additional wealth if not accompanied by a simultaneous increase in consumption (see Rich Pirog's opinion in an interview held by DeWeerdt, 2009). Instead, income may be increased in some regions (which implementing local trade circuits reduce import) and, at the same time, with equal consumption, it may be decreased (becouse of the reduced export) in others, due to the simple movement of wealth created respectively by the reduction of imports and exports between them under the scope of a single state or different countries. In particular, the reduction of import in developed countries negatively impacts on developing countries, where on the income of export depends the survival of entire local community in some rural areas. (Nevertheless, it is be noted, to produce for export does not always result in advantages for less developed countries[40]).

Moreover, the existence of economic benefits arising from implementing local circuits and foodstuff systems, including in the area where they are implemented, proves controversial in developing countries, due to social-economic constraints hindering the start-up of virtuous circles.

In any case an indisputable advantage of local circuits compared with import-export ones would be linked with the fact that the increased wealth created by the first can, where there are no constraints, produce a wider investments and employment multiplier than that created by the second, given that, according to some authors, the economic subjects (consumers and businesses) would instinctively be more inclined, where other conditions are equal, to consume and re-invest their income on or near their own territory.

With regards the positive economic impacts of the short chain, we can classify these as follow:

- positive impacts in terms of re-balancing, measured as the reduction of damages already assessed by some studies, or elimination of hypothesised risks, attributable to the growing power of LSRD. These can be assessed using indicators that are difficult to calculate;
- positive impacts in terms of growth (of farmers' income) and also of development (of marginal rural areas), the former measurable by direct

[40] In actual fact, an agriculture that is mainly focussed on export can increase food insecurity, trapping small farmers in a debt cycle and pushing them away from the land (De Weerdt, 2009). It all depends on the way in which sale take place and the type of contractual relations. A study carried out on small farmers of the state of Santa Catarina in south Brazil, Pretty (2006) reports better economic returns for these small farmers deriving from the direct sale of their products to consumers nearby, rather than from grow contracts of products to large commercial companies operating globally. However, the economic advantages deriving from the implementation of the local food systems has been shown only in some a few cases (DeWeerdt, 2009) in developing countries.

indicators that can be taken from the simple direct collection of certain data, and the latter by a more complex set of indicators, that consider the direct and indirect chain effects involving agriculture and other economic sectors.

The positive, re-balancing impacts can therefore be assessed as partial reallocation to farmers of the economic benefits that should be achieved by policies in their favour (particularly in developed countries) or by policies to liberalise international trade (particularly in developing countries), which instead are partially absorbed (Sexton, 2009) by the distorting effects of the market power (in this case oligopsonistic) of the LSRD. It is not easy to calculate this indicator, but we can use previous studies estimating losses;

Other re-balancing effects can be assessed in terms of advantages due to the increased trade inside the production area itself (avoiding the "leaky bucket" effect) both in developed and in developing coutries. In the latter, however, the said advantages of increased local trade circuits are, as said, controversial and difficult to identify and assess, even though the start-up of internal self supply circuits may efficiently oppose to the phenomena of progressive impoverishing, both of natural and human resources, and increasing food insecurity linked -in unbalanced contractual relations- to the massive and rather careless introduction of external production models (Shiva, 1995) for intensive productions (from monocultura) for export.

To further evaluate other re-balancing effects, another criteria for judgement that may be controversial as well as difficult to assess is the reduction of the Harberger's triangle, determined by the mark-up of oligopolistic LSRD businesses[41]. In this case, we need to first calculate the breadth of this triangle in market conditions that definitely differ from the perfect competition equilibrium and then its reduction in conditions still distant from the perfect competition, but less distant from it (due to a more widespread co-presence of different-sized businesses and market power, which tends to last where short chain sales circuits[42] become established.

The positive impacts on growth and development concern: the farmer's income and consumer; the development of marginal rural areas.

The positive impacts on the increase in the income of farmers can be assessed by the simple collection of pricing data at farm gate for farmers supplying the product to the commercial chains (directly or through

[41] The criterion is controversial insofar as this triangle may have little relevance and its reduction may also not occur due to the compensation of benefits of the high scale economies in oligopolistic businesses, considering that the reduction of costs due to greater efficiency may allow, without sacrificing profit, to reduce consumer prices to the same or a greater extent than as applied by business with lesser mark-ups, but which are less efficient.

[42] The market rebalancing function of which we have already discussed elsewhere (Sini, 2014).

intermediaries) and price obtained with the various alternative direct sales methods. The farm gate price' difference for the volume of product distributed or able to be distributed allows for a certain historic evaluation or forecast of revenue's increase and consequently (with equal costs sustained) of the net income of farmers involved in these short chain sales methods.

The positive impacts on the income of consumers can be controversial (products supplied via the short chain do not always cost less), but in any case can be measured directly from the difference in price seen on the market (to be multiplied by the volume, estimated or seen in purchases), which constitutes in itself a very simple, indisputable indicator. This indicator proves to be incomplete, however, unless the possible additional economic costs of consumer transport are subtracted (parallel to what has already been clarified in the estimate of environmental costs of the said transport), when they make longer journeys to reach the place of purchase.

The positive impacts on the development of marginal rural areas are difficult to see immediately as a whole as there is some difficulty in immediately evaluating the cumulative effects, but can be assessed through direct and indirect (social) indicators representing development.

The direct type indicators referring to increased investments and employment can be measured directly from historic data collection on previous increases (in similar situations) and through consequent calculation of investments and income multiplier, input-output tables using for assessments, with differentiated situations hypothesised, forecasting potential increases in the future in a certain area. Various studies on the income and investment multiplier have been performed and on the increase of employment linked to local food sales circuits[43]: for example in the region of Iowa by Swenson (2006, 2008, 2009, 2010)[44], in the central region of Puget Sound by Sonntag (2008)[45], in south east Minnesota by Meter and Rosales

[43] These are studies mostly already mentioned in paragraph 3.2 regarding market models.

[44] Swenson declared: "If farmers were direct sellers of half of their produce, assuming that there are sets of distributors across the region where farmers sell their produce to consumers while the remaining half of their produce is distributed via wholesalers to existing grocers, the sales outlets would support 398 jobs making $4.75 million. Once all of the transactions and input requirements are multiplied through the regional economy, 457 jobs and $6.3 million in labor income would be supported while the stores were in operation".

[45] Viki Sonntag calculated that "spending $100 at a local restaurant results in $79 in additional income to local businesses, while spending the same $100 at a chain restaurant results in just $31 being re-spent locally. When farmers in the region grow food for export, each dollar of sales generates $ 1.70 of community income, but every dollar spent at a farmers market generates a whopping $2.80 for the region's economy".

(2001)[46], and by others[47]. All these studies show the advantages of short food circuits for the development of local economies and, consequently, employment[48].

The positive impacts on the development of an area can therefore be evaluated through an assessment of the "local multiplier" that measures the number of times a unit of currency, moving hand-to-hand, circulates within an area, through a local economy (Bullock, 2000). A higher number of times means that more money is re-issued into circulation, as stated, thereby increasing investments, employment and income. Where there is an increase in money re-spent in an area, it is as good as attracting new capital to that area. In both cases, it is really new money in the hands of the receiver. On this, a study carried out by the NEF in Cornwall provides an interesting example, showing the quantity of the positive impact of the short chain "using a leaking bucket analogy to demonstrate that $10 spent on food from a vegetable box scheme is worth $25 to the local economy, whereas $10 spent in a supermarket is worth only $14 to the local area" (Boyde, 2001)[49]. These positive impacts on the development of a rural area can also be evaluated through increasing investments made by farmers (in terms of number and value); through an increase of integrated activities with farming, such as tourism[50] and, in any case, through an increase of activities in turn induced by or stemming from agricultural activity both upstream of this (eg. tourism which use local food, or agricultural services and technical means distribution companies) and downstream (small agri-food transformation manifactoring industries); through an increase in the number of businessmen and employees in farming; through an increase in the number of total businessmen and employees in the area; through other indirect indicators, considerable also as a social effect on the development of marginal rural areas, as an increase in the number of businessmen and young people employed in the farming sector (reduction in the ageing rate of workers) and the reduction of negative phenomena of depopulation and ageing of population underway in the area prior to implementing projects promoting alternative networks for selling local agricultural food produce.

[46] They asserted: "If people in the region bought just 15 percent of their food from local sources it would generate two-thirds as much income as the region's farmers receive from federal farm subsidies".

[47] Including the above mentioned Boyde 2001; Hughes, et al. 2008; Henneberry et. al. 2009.

[48] A 2005 study from the Iowa Farmers Market Association found that every two jobs at an Iowa farmers market gives rise to three jobs elsewhere in the economy.

[49] Moreover one must consider that the possibile synergies between the short food supply chain and other local economic activities can further amplify the effects of local multiplier (Van der Ploeg et al., 2000; Renting et al., 2003).

[50] Both in-farm (multipurpose agricultural enterprises) and in the territory by optimising food and wine tourism more generally, picking out routes to be taken between the farms.

With regards to the negative impacts of the short chain, we consider that these may above all derive from related protectionist effects, when consumer preference for local produce in wealthy countries precludes developing countries from finding an outlet for certain food products, on whose export they depend. In any case, when we see an increase of the sales of local products in a given area, without an overall increase of consumption within the same area, the increased wealth and employment, under the scope of the territory concerned, is, at least partly, offset on a global level by losses in other territories. This is seen due to the reduction in sales of food products imported from other regions of the same State or from regions of other Countries that may refer to areas included in developed or developing countries. In the latter case, losses have a more significant impact.

The indicators that could be suitable for the measurement of these negative economic (and at the same time social) impacts are based on the reduction of food products exported from developing countries and related income from export they lost, less the share of partial absorption of these lost earnings that -if sales had been made- would have been captured by commercial sector; on the potential multiplier effect lost that could have been realised from the lost earnings in an economy without alternative resources; on the assesment, linked to the previous lost income from export, of the negative chain reaction caused in terms of divestment and progressive impoverishing, which is difficult to evaluate. And, with reference to changes of import-export between regions within developed countries (reduction of food products imported by some regions from other regions of the same State or other States), such indicators are based on income and potential multiplier effect lost due to the lack of export in exporting regions. In this case, the multiplier effect must be considered as lower than for less economic developed countries (given that the latter have few alternative investments, whilst in developed countries it would have been overlaid against the multiplier effects of many other investments, sometimes in a way that is difficult to distinguish and difficult to assess).

The above mentioned negative impacts should be compared with the positive ones to assess the overall economic effects of changes in the balance of coexistence of long and short chain in different markets (in the same way that we have to assess as a whole both the environmental -as we have already seen- and the social impacts).

It is shown graphically -in the following figures 10 to 13- the types of economic impact and related indicators with measurement mode examined, in a framework that enphasized their connections and logical ordering.

Figure 10: Certain indicators of the positive economic impact of short chain circuits

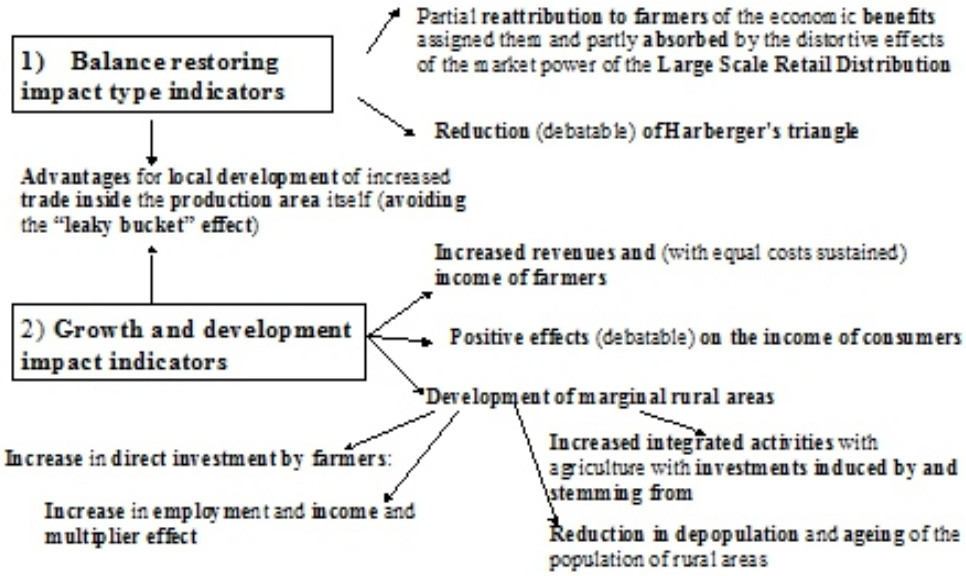


Figure 11: Certain indicators of the positive economic impact of short chain circuits on balance restoring

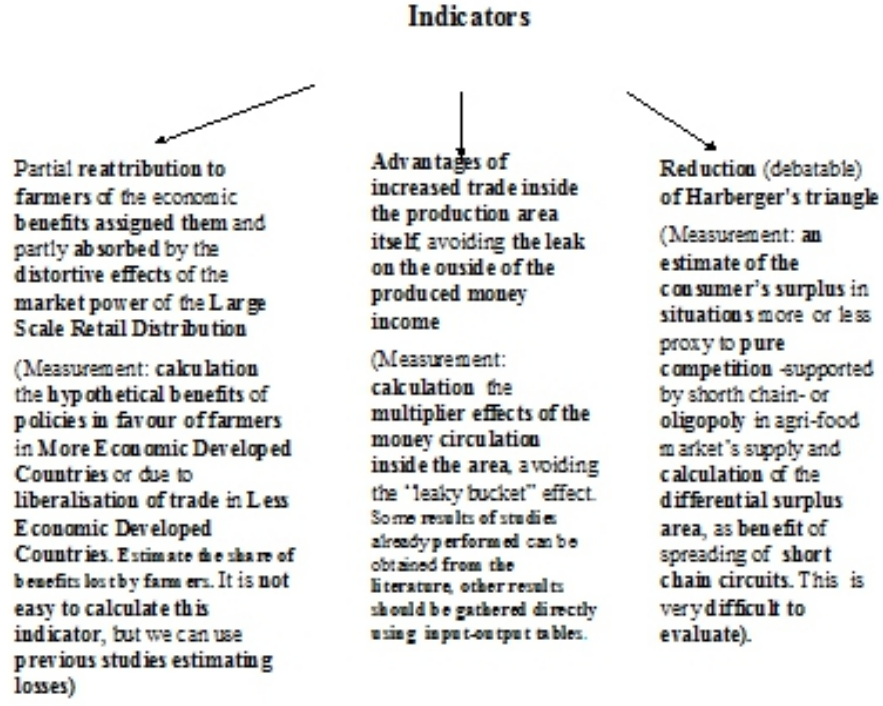


Figure 12: Certain indicators of the positive economic impact of short chain circuits on growth and development

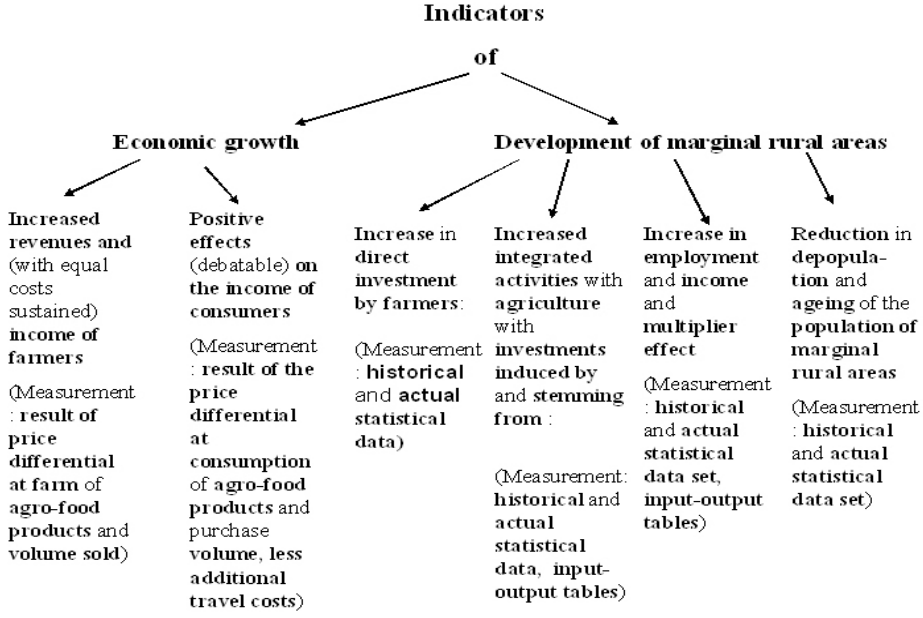


Figure 13: Certain indicators of the negative economic impact of short chain circuits

(in terms of global balance, with particular reference to the effect on developing countries of the choices made by developed countries)

Revenue lost by **Less Economic Developed Countries** (**or** by **poor regions** also in More Economic Developed Countries) due to **global fallout** of **maximising local circuits** in More Economic Developed Countries) :

↓

(Measurement: **calculation of the reduction** in the amount of **agro-food products imported** from **Less Economic Developed Countries** (and substituted with local products) and thus the **revenue lost** by them **through lost sales**.

When **calculating the lost revenue** one must, however, **deduct the portion which the farmers would anyway have lost** due the partial absorption of this income **which would have occurred in favour of the large multinational sales chains** for the **distortive effects** caused by the **market power of these** latter).

Potential positive multiplier effect lost through the **lost export income** in **economies without alternative resources** in **Less Economic Developed Countries** (or poor regions anywhere) .

↓

(Measurement: **calculation** - albeit very difficult- **of the lost potential multiplier effect**, which could have resulted from the earnings deriving from the export of agricultural food products which has been lost (**even having eliminated the** above mentioned **share absorbed by commercial interme-diation**).

Cumulative negative effects on **Less Economic Developed Countries** (or **poor regions** anywhere)

↓

(Measurement: **calculation of the negative chain reactions** the lost sales cause, in terms of **disinvestment and progressive impoverishment**. This is difficult to evaluate).

Measurement of social impact

As concerns social impacts, much of these derive indirectly from environmental and economic impacts, which reflect on the farmers', consumers' and society's wellbeing as a whole. These include, in particular:

- positively, short chain results on rural areas development, with effects linked with increased social vitality of the resident population,
- negatively, the devastating effects for the survival of entire local communities in some rural areas in developing countries due to a reduction in international trade (and income from export in developing countries, as a result of an increase in the marketing via short chain in developed countries).

As far as the positive effects are concerned, the most important, complex one, closely bound to economic aspects, is the strengthening of social cohesion within the community of a given area, thanks to the new network of economic relations set up by the local trade circuits. These economic relations actually lead both to creating new social relations and to reinforcing those that already exist between the members of the Community, and therefore increase both kinds of so-called *social capital* (Coleman, 1987; Putnam, 1993; Putnam et al., 1993; Ostrom, 2000) - *bridging* and *bonding* (Gittell, Vidal, 1998). This fact takes on particular importance in that it fosters in turn the circulation of information in the area involved and the setting up of other economic trade relations, since it facilitates transactions (generating those peculiar economies that are the result of a reduction in *transaction costs* (Coase,1937) typical of *marshallian* districts[51]).

There are also other positive short chain effects that can more specifically be defined just as socio-psychological aspects and are also linked with increasing social vitality. They may be assessed by intangible indicators.

As concerns the impact indicators, the following can be proposed as representative for the more tangible positive effects of rural development: an index of the reduction of de-population (already suggested as indicative of economic development); an index, partly linked to the previous, of the reduction of young emigration; an index of the increased presence of young people with higher qualifications (high school and university graduates).

With regard to the increased social vitality of the resident population, one could use some more complex indicators to be identified *exnovo* or choose from the many indicators (mainly proxy) recently experimented to measure the consistency of the "social capital". These indicators, which (differently from many other social capital identifiers linked more with social wellbeing and civic awareness) should be aimed at highlighting above all the

[51] See Becattini (1987, and following studies), Gaffard (1990), Ferrucci (1999) and many other works on *marshallian* districts.

possible growth of the networks of relations and social cohesion connected with the spread of short circuits for marketing foodstuffs, are given in detail in the following figure 15. About these indicators -with particular reference to the first graphically listed: an index of thickening of horizontal relations between economic and social actors of the area (number of times exchanges take place between the various network nodes[52], importance of individual nodes in terms of relations branching, network form) and the last: an index able to measure the sense of belonging to the community- it should be noted that some similar indicators have been actually used (Cicatiello, 2012) in a specific case-study[53].

Regarding the other mentioned positive effects of the short chain, which can be defined as psychological-social, all these hold contents which are exquisitely social, in psychological and relational terms. Are difficult to quantify as they concern components of social wellbeing that are intangible and not measured. They can nevertheless be evaluated by processing data of a qualitative type. It should also be considered that they have an effect on strengthening social cohesion and on the sense of belonging in local rural micro-realities, as well as on widening the networks of relations of the Communities settled therein, contributing to the growth of their above-mentioned "social capital".

With respect to the negative social impacts on developing countries (as fallout of a restriction to imports by the developed countries that increase the short chain), the ill-being indicators, wich may be representative, are not exclusively caused by the reductions in trade due to the short chain. So these indicators present problems of evaluation and curtailment of other cause-effect relations to isolate the effects actually ascribable to the reduction in exports determined by the expansion of the short chain in other importing countries.

It should also be noted that the negative effects of the reduction in export may be controversial if we consider the equally devastating effects of an exchange that, if based on asymmetrical conditions, tends to systematically impoverish local resources, damaging the resident population, as has certainly been the case with single-crops for export to the detriment of

[52] Single producers and their associations who communicate reciprocally or with single consumers or their associations. The latter, in turn, communicate reciprocally and, together with the former, with various cultural associations and social institutions (Chambers of Commerce, Banks, Research Boards, Technical Assistance Boards).

[53] Or, for better saying, it should be specified that some related sub-indicators, separate and systematically graded for the bridging and bonding aspects of the social capital, have been used to measure the social sustainability of trade via farmers' markets, compared with the LSRD channel and retail sales, with reference to their impact on a specific area chosen as case study.

other food productions for domestic supply (a fact that - in economic terms- may be in line with the compared costs advantages of different productions if -in balanced conditions of exchange- income were withheld mainly within the grow areas, allowing for the purchase of other goods produced elsewhere at more advantageous conditions).

An overview is given graphically -in the following figures 14 to 16- of the types of social impact and related indicators examined with their measurement mode (by tangible, proxy, intangible data).

Figure 14: Certain indicators of the positive social impact of short chain circuits

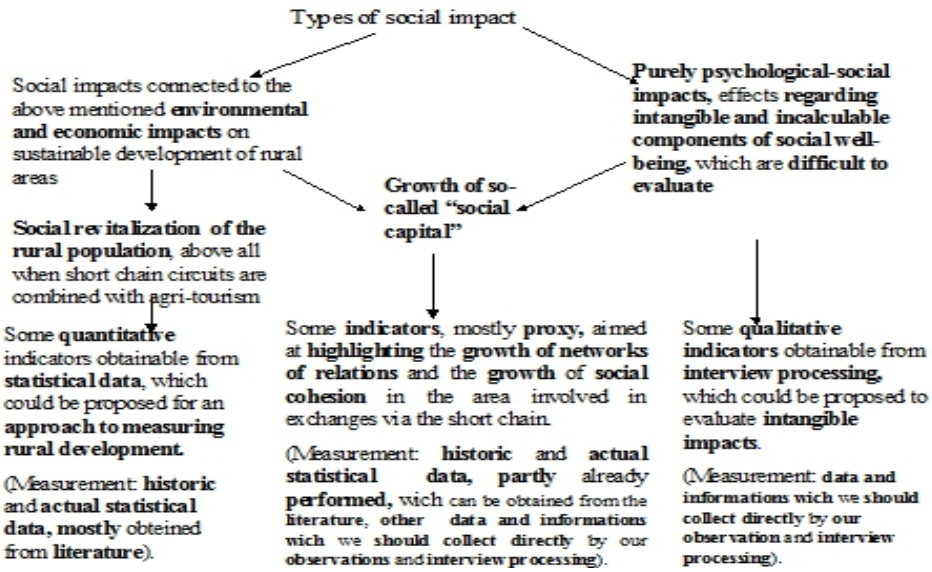


Figure 15: Certain indicators of the positive social impact of short chain circuits

Some **quantitative** indicators obtainable from **statistical data**, for an **approach to measuring rural development:**

- **An index** of the **reduction in depopulation** (already included among the economic impact indicators);
- **An index**, linked partly to the above, of the **reduction in the emigration of the youthful population**;
- **An index** of the **increasing number of qualified young people** (with high school diplomas or university degrees).

Some **indicators**, mostly **proxy**, which could be proposed to highlight the **growth of "social capital":**

- **An index of thickening of horizontal relations** between **social** and **economic actors of the area** (**number of times exchanges** take place **between** the **various network nodes**, **importance of individual nodes** in terms of **relations branching**, network form**);**
- **An index,** linked to the previous, **able to measure the speed at which information is spread;**
- **An index able to measure the ease of access to credit** (to be compared with previous situation);
- **An index** of **the extent of cooperative aggregation** (to be compared with previous situation);
- **An index** of the **reduction in unemployment** (mirroring that on the increased employment, already mentioned for economic development);
- **An index** able to measure **the sense of belonging** to the community (assessed from the **results of interviews** with specific **diagnostic questions** in that sense).

Some **qualitative indicators** obtainable to evaluate **intangible impacts** through **the processing** of proposable **interviews** (using **interviewee statements):**

- **The relationship between consumers and producers** and the **reciprocal satisfaction** of a **direct dialogue**;
- The **producers' satisfaction** in have more **independence** in their productive work and the enhancement in their **professional pride** through being able to demonstrate the **specific quality of their product** directly;
- The **consumers' satisfaction** relating to: **appreciation** of the taste of the **fresh local seasonal product** (which may be consumed within 24 to 48 hours after harvesting at zero Km); **cultural and health** value; and **benefits for the environment** attributed to local products;
- The **time and place of purchase** as a **social meeting point** and source of **amusement** for the purchasers;
- **Upgrading** of **local rural culture and interrelations** and **cultural exchanges between town and country.**

Figure 16: Certain indicators of the negative social impact of short chain circuits

(**connected** to the above mentioned **economic impacts**)

Impact: devastating effects for the survival of entire communities in some rural areas in Less Economic Developed Countries deriving from the reduction in international trade (due to global fallout of maximising local circuits in More Economic Developed Countries), which are difficult to evaluate.

Indicators:

- **An index of possible increase in malnutrition** (Measurement: **historic** and **actual statistical data set**)
- **An index of a possible reduction in life expectancy** (Measurement: **historic** and **actual statistical data set**)
- **Other indicators of general social malaise as a result of increasing poverty. These are intangible and cannot be measured precisely** (Measurement: **observers' statements processing**)

These indicators present **problems of evaluation** and **curtailment of other cause-effect relations to isolate the effects** actually **ascribable** to the **reduction in exports determined by the expansion of the short chain in other countries.**

It should **also** be noted that the negative effects of the reduction in export **may be controversial** if we consider the equally devastating effects of an exchange based on asymmetrical conditions.

Conclusion

The need is felt to identify, in terms of market shares that can conveniently lie with each, the optimum balance of coexistence, or at least efficient balances, between the long and short chain in the markets system on a local and global level.

In order to achieve this, a complex evaluation would need to be carried out, using suitable models able to simulate market function mechanisms and which have been specifically designed to support this evaluation. At present, there is a distinct lack of this type of model, namely of models able to represent alternative situations with a different degree of incidence of the two different food product outlet methods in various contexts, and with other system variables in different combinations. There is also objective difficulty in constructing such models and having them function, both by virtue of the complexity of the situations to be represented and given the scarcity and inhomogeneity of the data available and necessary to give consistency to the indicators within the models that express the impacts of the market function mechanisms they simulate.

However, it is hoped that the progressive diffusion of common knowledge, of both data and evaluation methods, knowledge that grows

exponentially when released to the global information network, can allow for better evaluation performance in the near future, with an interdisciplinary work of economists and scholars involved in this matter in various ways.

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